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APPENDIX.

No. I.

In page 119 is a letter from Mr. Verral, respecting the application of his prone couch in a case of very extensive scalding, which occurred on board H. M. S. Hyperion. At the date of Mr. V.'s letter, 20th January, 1830, the case had been under treatment for about a fortnight, with every prospect of ultimate success. The following letter states the final result.

Sir, *Seaford, 7th Dec.* 1831.

In reply to your letter, I have the pleasure of informing you that the man on board the Hyperion recovered perfectly under the use of the prone couch. He lay on it for about three weeks constantly, without any inconvenience, excepting a slight swelling of the legs; and at the end of that time the wounds were so nearly healed that he was enabled to walk about, and very soon after to return to his duty.

The only case since that, in which I have had an opportunity of trying it, was in a young man who, on recovering from a very severe attack of typhus, which lasted five weeks, had extensive ulcerations on the hips and on the sacrum, so that he could not lie in bed without very great suffering. He tried the couch for a few nights, and found the greatest relief from it.

I am, &c.
Charles Verral.

A. Aikin, Esq.
Secretary, &c. &c.

No. II.

LETTER FROM J. M'ARTHUR LOW, Esq. COMMANDER R.N., ON MR. REYNOLDS'S REPEATING SEXTANT.

Sir, *Portsmouth, 21st March,* 1831.

In a letter of 24th March, 1829, I recommended to your notice an invention by Mr. Reynolds, for registering on the arc of the sextant observations made therewith. For that improvement of an instrument so useful to mariners, the gold Isis medal was liberally awarded; and I felt truly gratified to find that the Society had given such strong proof of concurrence with my hastily expressed opinion as to its merits. I wrote, however, as if the instrument I recommended were in itself adequate to the recording of observations made under all possible circumstances; and on turning over the 47th volume of the Society's Transactions, was greatly surprised at finding, in pages 115 and 116, the following observation:

" The repeating stops will only act when the series of observations is occasioning the index to recede from the stop-frame; there must therefore be two stop-frames, one on each side of the index; and in preparing the instrument for use, that stop-frame which is not wanted must be slid along the arc, and secured at a sufficient distance from the index not to interfere with it."

Here would be twice the expense I contemplated, to say nothing of encumbrance and inconvenience in having two registers to one sextant; but on reference to the engraving, and, afterwards, on inspection of the model in the Society's Rooms, the observation appeared to be perfectly correct. I have, therefore, much satisfaction in providing a complete and easy remedy for that defect, by sending you a drawing made from the register I have used myself, and lent to the Rev. Professor Inman, of the Royal Naval College, by whom it was exhibited and properly noticed in the course of his lectures on Nautical Astronomy.

It will be evident, on inspection of the drawing, that by placing a fixed stopping-pin, like that marked *c* in Plate VII. fig 9, on the opposite side of the stop-frame, I render both sides thereof precisely alike, and make the instrument fit for use on whatever side of the index the observation to be made may require. The addition of such a fixed stopping-pin, with a suspensor of silk or fine catgut, for keeping the mill-headed key always in safety and readiness, would render the model in the Society's Rooms complete, and similar to the register made by Mr. Stebbing, optician, of Portsmouth, which I have hitherto used. Shifting the mill-headed key from one binding-screw to another, is, however, in some measure objectionable, although it be thus kept suspended, and ready; I have therefore given preference to binding-screws complete in themselves, each being made with a milled head.

I am, &c.

A. Aikin, Esq. J. M'Arthur Low,
Secretary, &c. &c. *Com. R. N.*

No. III.

1, Charles Street, Clarendon Sq. Somers' Town,
Sir, *November* 24, 1831.

In my description of a punch for hardening brass, Vol. XLVII. p. 155, there is an omission of the statement respecting the proper curve to be given to the top of the punch; for the punch is required to endure the greatest violence it can bear from the hammer short of flying to pieces. If the punch was flat at top, the least inclination of the hammer would break off the edges, and leave an unsound top for future blows; if rounded too much, a little inclination of the hammer would direct the force of the blow quite to one side of the hole, and the metal below would only receive the impression as reflected obliquely from that side, therefore the opposite side of the hole would share the blow. This cross action produces a vibration, from which the punch is liable to fly to pieces, and the whole block is liable to fly aside, from what is called a foul blow; but let the centre of the bottom face of the punch be the centre from which the top is curved, and every blow will be directed to the metal, with the smallest lateral deviation.

I am, &c. &c.

CORNELIUS VARLEY.

A. AIKIN, Esq.
Secretary, &c. &c.

No. IV.

MR. HARRISON'S description of his Escapement, p. 54, is not quite so clear as it might have been. The reader will therefore have the goodness to receive the following as a substitute, as far as relates to the description of the principle of the machine, and the reference to the plate.

The principle on which this escapement acts is, that the two small weights placed one on each side of the pendulum are alternately raised by the escape wheel or train. These weights, in their alternate descent, urge the pendulum. Hence the pendulum is always urged by an equal force.

The frame of the right pallet, which the wheel thrusts higher, is purposely loaded more than is necessary for maintaining the motion of the pendulum, in order that it may require a partial counterbalance on the opposite side. This small counterbalance is made the adjusting weight to regulate the impulse; but it is also a lifting weight to the short arm *i*, on which the pallet frame is jointed. The arm of the left pallet, which the descending tooth of the wheel pulls lower, is as much more than counterbalanced as is requisite to give the impulse. By this arrangement, the counterbalance weight of one pallet is adjustable, and the impulse weight of the other is adjustable. They slide on plain arms, projecting from their respective pallet arbours, and have screws to fix them. Thus they are alike in being adjustable; but being opposite in their service, they both project towards one side of the clock, and are near together, which conveniently brings the two adjustments to one place, where they may be moved nearer to, or farther from, their axis, till the pendulum receives a suitable oscillation.

Fig. 1, a perspective view of the escapement; the escape wheel *a* locked on the rolling pallet *b*.

Fig. 2, a front view, having the wheel locked on the opposite rolling pallet *c*: these pallets roll in their frames *d* and *e*, which are jointed at *f* and *g* to their respective arms *h* and *i*; these arms project from separate axes *j* and *k*, placed right and left of the pendulum; from these axes descend the separate crutch-pins *l* and *m*, between the bent ends of which the pendulum rod *n n* hangs. The axes *j* and *k* have also their separate arms *o* and *p*, to carry the small adjusting weights *q* and *r*. The pendulum rod is cranked to receive a roller *s* in a line with its axis; against this roller the crutch-pins act. The pallet arms *h* and *i* have projections *v* and *x*, which alternately support the train in fig. 1. The wheel *a* rests on the pallet *b*, and has therefore pulled its frames *d* down, and made it hang by the top bar *u* on the hook *v*. In doing this it has pulled the joint *f*, and raised the adjusting impulse weight *q*, and immediately the opposite pallet *c* begins rolling down the back of the tooth from which it was unlocked; the momentum of the weight *t* then gives impulse to the pendulum by the crutch *m*, till the pallet *c* is at the bottom of the tooth. The descent of the weight *t*, and the arm *i*, have separated the projection *w* from its abutment *x*. In fig. 2, the pendulum roller *s* has pushed the crutch-pin *l*, and unlocked the pallet *b*; the weight *q*, which was previously raised, now presses the crutch-pin *l* against the pendulum roller *s*, and will give impulse till the pallet *b* has rolled along the back and to the bottom of the tooth, in doing which the frame *d* will be raised a little, and will lift its bar *u* up from the hook *v*. The opposite tooth, rising against the pallet *c*, has lifted the impulse weight *t* with the frame *e* and the arm *i*, and brought the stud *w* against the abutment *x*. The dotted line *m* is now the place of the crutch-pin (the other ought to have been the dotted one), and the distance from it to the other shews the measure of the impulse against the roller *s*. Thus the train lifts the impulse weights, and the pendulum has nothing to do with the train but merely to unlock it; and as the pallets are rollers, that labour is reduced; and if by any change of force in the train the tooth should rest harder on the roller, so as to give the pendulum more work, it would, in passing the roller so much quicker, press it and the impulse weight up more nimbly, and thus relieve the pendulum in proportion; for the pendulum has to lift the impulse weight at the moment of unlocking through a very small space. The space through which impulse is given to the pendulum is measured by the depth of the teeth.

The small weight *r* is only sufficient to lift the arm *i* and crutch-pin *m*, and to be an adjustment for the greater momentum of the impulse weight *t* on the opposite side; but the weight *q* is an adjusting impulse weight. Thus the two adjustments are conveniently placed on one side.

Fig. 3 is an upper view of part of the axis *k*, shewing the adjusting counter-weight *r*, the arm *i*, and the roller-frame *e*.